VVSG Requirements for Human Factors and Privacy

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A “standard” is not necessarily a regulation, and can be “voluntary guidelines”

- A document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

  (VVSG Glossary / ISO Guide 2-2004)

VVSG Section 2.2.7 draws on many industry standards and regulatory sources

- Federal Voluntary Voting System Standards VSS 2002
- 36 CFR Part 1194 (“Section 508”)
- ADA Accessibility Guidelines (ADAAG)
- ANSI INCITS 354 Common Industry Format (CIF) for Reporting Summative Usablity Tests
- Draft IEEE P1583
- NASED Technical Guide #1

Some critical decisions were made in applying the resolutions to the VVSG guidelines

- General equipment vs. election specific
- Conformance tests for equipment
- Performance vs. design guidelines
- Guidance for ballot design, setup, etc

The outline of VVSG 2.2.7

1. Accessibility
   - 1.1 General
   - 1.2 Visual
   - 1.3 Dexterity
   - 1.4 Mobility
   - 1.5 Hearing
   - 1.6 Speech
   - 1.7 Cognitive
2. Alternate languages
3. Usability
   - 3.1 Usability testing
   - 3.2 Functional
   - 3.3 Cognitive
   - 3.4 Perceptual
   - 3.5 Interaction
4. Privacy
   - 4.1 Voting station configuration
   - 4.2. Anonymity for alternate ballot formats

VVSG strengthens and further defines the accessibility and usability requirements in VSS 2002

- Accessibility updated and enhanced from VSS 2.2.7
- Limited English Proficiency requirements added
- Usability updated and enhanced from VSS 3.4.9, NASED Technical Guide #1, and Usability Appendix
- Privacy requirements added

Changes from VSS 2002 to VVSG: **accessibility**

VSS 2.2.7.1 - Requirements for clearance and reach

- VVSG (2.2.7)1.4 – Updated to meet 2004 ADAAG
- VVSG (2.2.7)1.4.2.5 – Added requirement for visibility of controls

VSS 2.2.7.2 b – Requirements for audio-tactile ballot

- VVSG (2.2.7)1.2.2.2 – Rewritten, but keeps basic requirements
  - Adds explicit requirement, ATI have same functionality as other ballot interfaces in VVSG 2.4
  - Provides for repetition, pause and resume, skip-ahead
  - Provides for standard audio jack, volume control, and headphone

VSS 2.2.7.2 c – Wireless coupling

- VVSG (2.2.7)1.2.2.3.2 – Maintains this requirement

Changes from VSS 2002 to VVSG: **accessibility**

VSS 2.2.7.2 d – Electromagnetic interference, hearing aids

- VVSG (2.2.7) 1.2.2.3 maintains this requirement

VSS 2.2.7.2 e – Low vision color, contrast, size

- VVSG (2.2.7)1.2.1 – Rewritten, but keeps basic requirements
  - Adds explicit requirement for distinguishable buttons and controls
  - Adds explicit requirement for synchronized audio/screen display

VSS 2.2.7.2 f – touch screen activation

- VVSG (2.2.7)1.3.2, 3.5.4 – Maintain this requirement

VSS 2.2.7.2 g, h, i – response time, sound cues, biometrics

- VVSG (2.2.7)3.5.3, 1.5.2, 1.1.3– Maintain this requirement

Changes from VSS 2002 to VVSG: Personal Assistive Technology difference

VSS 2002 2.7.1

"DRE voting systems shall provide, as part of their configuration, the capability to provide access to voters with a broad range of disabilities. This capability shall: (a) Not require, the voter to bring their own assistive technology to a polling place;"

VVSG 2.2.7.1.2

"An Acc-VS shall provide accessibility to voters using their own personal assistive devices"

Changes from VSS 2002 to VVSG: **LEP**

VVSG (2.2.7) 2 Alternative language requirements for Limited English Proficiency added

- Candidate names displayed or pronounced in English
- Alternative language ballots and instructions
- Audio ballots for illiterate voters

Changes from VSS 2002 to VVSG: **usability**

VSS 3.5.4 – Controls and Displays

- VVSG (2.2.7) 3.3.4, 3.3.5, 4.4.1 maintain this requirement

VSS – Usability Appendix

- VVSG (2.2.7) 3.2 Enhances voter interaction from Appendix
  - Review of ballot
  - Notification of overvoting and undervoting
  - No scrolling, clear feedback, help anytime

VVSG (2.2.7) 1,2,3 – Usability Testing added

- Recommends that vendors submit summative usability test reports in CIF format

Changes from VSS 2002 to VVSG: **privacy**

VSS 2.4.1.2 – Marking ballot in privacy

- VVSG (2.2.7) 4 enhances this requirement
  - Visual privacy
  - Audio privacy
  - Overvote notification preserves privacy
  - Voter anonymity for alternative format ballots

Changes from VSS 2002 to VVSG: **Human factors and VVPAT**

VVSG 6.8 contains requirements for VVPAT where required by states

- VVSG (6.8) 2.1 all 2.2.7 usability requirements apply
- VVSG (6.8) 3.1 all 2.2.7 accessibility requirements apply
- VVSG (2.2.7) 1.2.2.6 ACC-VS should provide VVPAT features for blind voters; shall provide VVPAT paper record for visually impaired voters; also (6.8) 3.5 should provide features for blind voters
- VVSG (6.8) 2.2 should be able to show paper in 2 font ranges
- VVSG (6.8) 2.3, 2.4 easy to read and compare, instructions on voting station
- VVSG (6.8) 3.2, 3.3, 3.4 alternate language, names in English
- VVSG (6.8) 5 preserves the voter's privacy and anonymity

Research is underway to further address resolutions in future VVSG

- Usability performance benchmarks
- Plain language guidance for ballots, instructions, error messages
- Guidance for ballot design
- Guidance for interaction design
- Usability of standards
- Further refinement of accessibility guidelines

Questions and Discussion

Back Up Slides

What requirements or issues in the VVSG are causing some debate?

- Should voters be able to connect personal assistive technology?
- Dexterity requirements are not as strong as those for visual disabilities
- How should “best practices for election officials” in using voting systems be communicated?
- How do we factor in feasibility and cost?

Personal Assistive Technology

There are differences in language that reflect two different concepts and must be resolved.

VSS 2002 2.7.1

"DRE voting systems shall provide, as part of their configuration, the capability to provide access to voters with a broad range of disabilities. This capability shall: (a) Not require, the voter to bring their own assistive technology to a polling place;"

VVSG 2.2.7.1.2

"An Acc-VS shall provide accessibility to voters using their own personal assistive devices"

VVSG only includes requirements for an audio jack for personal assistive technology

- 2.2.3.1 The ATI shall provide its audio signal through an industry standard connector for private listening using a 3.5mm stereo headphone jack...

VVSG also has requirements to avoid interference with hearing aids

- 2.2.3.2 When a voting station utilizes a telephone style handset/headset ... it shall provide a wireless T-Coil coupling for assistive hearing devices ...
- 2.2.3.3 No voting station shall cause electromagnetic interference with assistive hearing devices ...

Security must be considered in allowing connections for personal assistive technology

- Connection ports, especially standard ports, create a security risk, by opening access to the voting system

- Section 508 1194.25(a) provides a useful definition:

  "Self contained products shall be usable by people with disabilities without requiring an end-user to attach assistive technology to the product. Personal headsets for private listening are not assistive technology."

Requirements for dexterity disabilities and blindness are not equal

- Section 2.2.7.1.2.2.5

  If the normal procedure is for voters to submit their own ballots, then the Acc-VS **shall** provide features that enable voters who are blind to perform this submission.

- Section 2.2.7.1.3.5

  If the normal procedure is for voters to submit their own ballots, then the Acc-VS **should** provide features that enable voters who lack fine motor control or the use of their hands to perform this submission.

An “accessible” voting system can be used in a way that makes it inaccessible.

- During the drafting of Section 2.2.7., best practices for ensuring that requirements are met in the polling place were included. These are now collected in an appendix.

- How should “best practices for election officials” in using voting systems be communicated?

The Board of Advisors also raised some questions and made recommendations for changes

- Recommendations
  - All accessibility requirements be gathered in one section. There are some scattered in other sections.
  - Usability testing by vendors be required (upgraded from “should” to “shall”

- Discussion points
  - Security vs. personal assistive technology
  - Mobility/dexterity “should” vs. visual disabilities “shall”
  - Vendor usability testing: should vs. shall

Late edits to the VVSG, upgraded some requirements from “should” to “shall”

- 2.2.7.1.2.2.6 Accessibility of VVPAT
  - If the normal procedure includes VVPAT, the Acc-VS should provide features that enable voters who are blind to perform this verification.

    If a state requires the paper record produced by the VVPAT to be the official ballot, then the Acc-VS shall provide features that enable visually impaired voters to review the paper record.

- 2.2.7.1.2.1.9 Synchronized audio and video displays
  - Any voting station using an electronic image display shall provide synchronized audio output to convey the same information as that which would be displayed on the screen.

Late edits to the VVSG, upgraded some requirements from “should” to “shall”

- 2.2.7.1.2.1.5 – Voters can adjust color and contrast (no requirement for poll worker assistance)
  - An Acc-VS with a color electronic image display shall allow the voter to adjust the color or the figure-to-ground ambient contrast ratio.

- 2.2.7.1.2.2.2.5 Audio ballot allows the voter to skip reading referendum text
  - The ATI shall allow the voter to skip over the reading of a referendum so as to be able to vote on it immediately.

Usability Performance-Based Standards need conformance tests that are reproducible and not require huge numbers of test subjects

- At this time, usability performance of voting systems is not being measured
  - Inspection of design is easy, reliable, but not very powerful
  - Following design standards and guidelines does not necessarily insure usability
  - Usability engineering and human factors provides measurement methods, but not necessarily to the degree we need for voting equipment
- Usability performance standards will require the development of benchmarks and test protocols suitable for conformance testing